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## The Relationship Between Manifest Anxiety and Test Anxiety

By WILLIAM H. LYLE AND CHARLES D. SMOCK

Anxiety as an important determinant of behavior has been receiving increasing attention from both the clinician (5, 6, 15, 19, 23) and the experimental psychologist (2, 4, 8, 21). Several measures of anxiety have been developed (6, 7, 9, 22) in order to study the relationship between anxiety as a personality variable and behavior in a variety of experimental situations. The purpose of this investigation was to study the interrelationships among three of the more widely used anxiety scales. Normative characteristics of the scales for the population sample will also be presented.

**Mandler-Sarason Test Anxiety Scale.** The Mandler-Sarason (M-S) scale was designed to measure the extent to which specific test situations arouse anxiety reactions incompatible with task-relevant (goal-oriented) responses. The theoretical assumption underlying the development of this scale was that any "testing" situation arouses both task-relevant and anxiety drives. Further, the anxiety drive may arouse either task-relevant or task non-relevant responses depending upon the individual's learned reaction tendencies to anxiety. A score on the test is assumed to be an index of the degree to which an individual tends to make *task-irrelevant* responses under conditions of anxiety arousal. A series of studies by Mandler and Sarason (13, 14, 19) (and one with Craighill, 18) tend to confirm several predictions derived from this general theoretical schema concerning the performance of high and low "test anxiety" subjects under varying experimental conditions. A general description of the questionnaire (20) and normative data on approximately 750 subjects have also been published.

**Taylor Manifest Anxiety Scale.** A description of the form of the A-scale used in this study may be found in a recent article by Taylor (22). A score on this test is assumed to be an index of the level of excitability or emotionality that reflects the subject's general drive level. Hypotheses derived from the notion of the relationship between drive and response strength have been confirmed in simple conditioning experiments (2, 8, 17, 21) as well as more complex learning tasks (4, 12, 16).

**K-Scale.** The K-scale on the MMPI was developed as an index of the extent to which individuals were influenced by the social favorability of the items and has been included, as filler items, in the A-scale. The social desirability of the items has proved

an important source of variance on the A-scale. The relationship between the K-scale (filler items in the A-scale) and the anxiety scales obtained from the high school population are included in this report for comparative purposes.

**Forced Choice Form of the A-Scale.** Heineman (7) developed a forced choice form of the A-scale in an attempt to reduce the tendency for subjects to choose more socially desirable responses. Kabrick (9) revised this initial forced choice form to make it conform more closely with the revision of the A-scale (22).

The revised forced choice form (FC) consists of one-hundred blocks of three statements: an anxiety statement and a non-anxiety statement matched for social favorability; and a non-anxiety statement differing in social favorability. The subject is forced to choose both a statement that is characteristic of him and one that is not characteristic of him. Two scoring keys for the FC-form were developed by Heineman (7) and a full discussion of the scoring method may be found in that report. A third Key (FC-X), which omits the supplementary refinements used by Heineman and considering only the ranking of the single anxiety item in a block, was also used in this study.

#### SUBJECTS AND PROCEDURE

The tests were administered to the sophomore, junior and senior classes of an Iowa consolidated high school. The anxiety scales were administered approximately 6 weeks apart; the A-scale, the FC-form and the Mandler-Sarason, in that order. The sample consisted of 66 males and 95 females. Of these, 62 males and 90 females completed the A-scale and the FC-form. Only 55 males and 82 females of this latter group completed the Mandler-Sarason scale.

#### RESULTS AND CONCLUSIONS

**Interrelationships among the Anxiety Scales.** Correlations among the scales were computed separately for the male and female groups (see p. 409). Since comparisons of the correlations for male and female groups separately yielded only one significant difference, the two groups were combined for purposes of comparing the intercorrelations among the anxiety scales.<sup>1</sup> Table 1 presents the intercorrelations among the three anxiety scales for the total sample. The correlation between the M-S and A-scale is signifi-

<sup>1</sup>The correlation between FC-1 and FC-X was .86 for the females and .95 for the males. This difference is significant at the one per cent level of confidence.

**Table I**  
Intercorrelations among the A-scale, M-S scale, and FC-scale<sup>1</sup>

	A	M-S	FC-X	FC-1	FC-2
A		.37	.64	.61	.41
M-S			.38	.28	.34
FC-X				.92	.73
FC-1					.83

cantly lower than between the A-scale and FC-X ( $t = 3.72$ ;  $p = .01$ ) or FC-1 ( $t = 3.03$ ;  $p = .01$ ).<sup>3</sup> There is no statistically significant difference in the relationship between the M-S and A-scale as compared to the relationships between the M-S and FC-X; M-S and FC-2 or the A-scale and FC-2. From these obtained intercorrelations it would seem reasonable to infer that the Mandler-Sarason test anxiety scale is relatively independent of either form of the A-scale.

The correlation between the A-scale and the FC-2 is significantly lower than between the A-scale and FC-X ( $t = 5.01$ ;  $p = .001$ ) or FC-1 ( $t = 5.41$ ;  $p = .001$ ). This may be interpreted as a result of the reduction of the influence of social favorability on responses in the Key 2 scoring of the forced choice form of the A-scale (7, 9). The fact that the A-scale and both FC-X and FC-1 correlate equally well with the K-scale supports this contention.

**Relationship between the K-scale and the Anxiety Scales.** The correlations obtained between the K-scale and the anxiety scale were: A =  $-.31$ ; FC-1 =  $-.28$ ; FC-2 =  $-.11$ ; M-S =  $-.20$ ; and K and FC-X =  $-.32$ . Kabrick (9) did not report the relationship between the K-scale and the total forced choice scores so no direct comparison is possible. However, the correlations between the K-scale and the A and FC form are significantly lower than those reported by Heineman (7) for his forced choice form with a college population (K and A,  $t = 5.959$ ,  $p = .01$ ; K and FC-1,  $t = 3.35$ ,  $p = .01$ ; K and FC-2,  $t = 3.14$ ,  $p = .01$ ). The relation-

<sup>1</sup>Comparison of each correlation in this table with every other correlation indicated a difference as large as .09 or larger yields  $t$ 's significant beyond the .05 level of confidence. It should be noted, however, that comparisons between the three scoring keys of the forced-choice test are not strictly permissible due to the inability to estimate the effect due to lack of independence of the item entering into more than one scoring key.

<sup>2</sup>Correlations involving the M-S scale are based on an N of 137. All other correlations based on 152 Ss.

<sup>3</sup>The formula for comparing the intercorrelations was obtained from Lindquist (11).

ship between the K and FC-2 is significantly less than between the K and A-scale ( $t = 2.71$ ,  $p = .001$ ), the K and FC-1 ( $t = 6.01$ ,  $p = .001$ ) or K and FC-X ( $t = 5.86$ ,  $p = .001$ ). The differences in the relationship of the K scale and the anxiety scales obtained in this study as compared to the previous one may be due to the nature of the populations sampled. The significantly lower relationship between the K and FC-2 as compared to the other scales is consistent with the previous findings (7, 9) that Key 2 is the least susceptible to bias due to the social favorability of the items.

**Reliability.** Reliability of each of the anxiety scales was computed by the split-half method and corrected with the Spearman-Brown prophecy formula. The obtained estimates of reliability were: M-S, .91; A-scale, .87; FC-X, .80; FC-1, .79; and FC-2, .73. The reliability of the M-S and A-scales are not significantly different, but both are significantly more reliable than any of the forced choice keys ( $p = .01$  in each case). The FC-X and FC-1 scoring keys are significantly more reliable than the FC-2 key ( $p = .05$  in each case).

**Normative data.** The means, medians, standard deviations, and ranges of the anxiety scales obtained from a high school population are presented in Table 2. The means of the manifest anxiety scales are slightly, but consistently, higher than previously report-

**Table II**

Means, Median, Standard Deviation, and Range of the A-scale, M-S scale, and FC-scale Based on Three Scoring Keys

Scale	N	Mean	Median	SD	Range
A	152	16.78	16.30	7.47	2-39
M-S	141	14.27	13.67	6.92	1-31
FC-X	152	33.94	33.75	9.22	14-58
FC-1	152	51.85	52.12	7.95	30-74
FC-2	152	57.07	56.75	8.73	33-83

ed (7, 9, 22); but the data in Table 2 are roughly comparable to that obtained from college students. Sarason and Gordon (20) do not report a mean M-S score for their sample, but their reported median (between 18 and 19) is higher than obtained from our sample (13.67).

Two studies (1, 21) have reported higher anxiety scores for female subjects than for male subjects; none report significant differences however. Table 3 indicates that the females from this high school sample obtained significantly higher mean anxiety scores on all the scales with the exception of the A scale.

**Table III**

Comparison of the Means of High School Male and Female Ss on the A-scale, M-S scale, and the FC-scale Based on Three Scoring Keys

Scale	Male		Female		t	p Value
	M	SD	M	SD		
A	16.50	7.90	17.15	7.29	.....	.....
M-S	12.57	7.31	15.39	6.41	2.39	<.02>.01
FC-X	31.03	8.41	35.94	9.28	3.32	<.001
FC-1	49.08	7.57	53.76	7.61	3.72	<.001
FC-2	52.11	7.39	60.48	8.56	6.22	<.001

The following tentative conclusions seem warranted from these data. The anxiety scales may be used with high school populations without loss of reliability. The scores also seemed to be less influenced by the social-favorability of the items for this age group than for the college population. However, the Mandler-Sarason and forced choice form of the A-scale yield significantly different mean scores for the high school male and female subjects.

The positive relationship between the manifest anxiety scales and the test anxiety scale is sufficiently low that we may infer the tests are tapping relatively independent psychological processes. If such is the case, then further research should reveal the empirical relationship between the "kind of anxiety" and its behavior correlates as well as the relationship between the two constructs. On the other hand, if the scales merely differ in respect to the extent to which they tap a single psychological process, then it should be quite feasible to determine which scale leads to the most precise experimental prediction regarding the functional relationship between anxiety and behavior.

#### SUMMARY

The Taylor Manifest Anxiety, a forced choice form of the A-scale, and the Mandler-Sarason test anxiety questionnaire were administered to 152 high school students. The results indicate that the manifest anxiety scales are relatively independent of the test anxiety scale. Although significant sex differences were noted on the test anxiety and the forced choice form of the A-scale, all of the anxiety scales seem suitable for use with a high school population. The relative independence of the "manifest" and "test" anxiety scales was discussed briefly in terms of some of its implications for future research.

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